

LINEAR POLARIZATION MEASUREMENTS OF GAMMA RAYS FOLLOWING ALPHA DECAY

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An $85\text{mm} \times 85\text{mm} \times 20\text{mm}$, 14×14 strip, planar germanium double sided strip detector (HpGeDSSD) has been used as a Compton Polarimeter to measure the linear polarization of photons emitted from aligned nuclei. Gamma rays following alpha decay in the $^{227,228}\text{Th}$ decay chains were used both for calibration of the device [1] and for investigating the veracity of parity assignments based on systematic trends [2]. An experimental arrangement of two interchangeable alpha detectors arranged 90 degrees apart allowed many systematic properties of the device to be investigated. Each of the pixels could be used both to scatter and absorb gamma rays, allowing high sensitivity ($>60\%$ of the Klein Nishina formula) and high efficiency to be achieved. This combination yields a “figure of merit” of unprecedented value. A description of the experiment and current status of data analysis will be presented and the potential future uses of this device will be discussed. This research was supported by the U.S. Department of Energy, Office of Nuclear Physics, under contract number W-31-109-ENG-38.

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- [2] R. K. Sheline *et. al.*, Phys Rev C **57**, 104 (1998).